

CLAIMS:

1. An offset measurement method in a processing apparatus which comprises:

a position detection imaging device that images an object to be processed, and

a tool which is installed so as to be offset with respect to said position detection imaging device and processes said object to be processed,

said offset measurement method comprising:

a step of projecting a reference pattern toward said tool at a specified angle of inclination with respect to a measurement direction from a light source that is disposed in a specified position,

a step of measuring a position of said tool based upon said reference pattern projected on said tool,

a step of measuring a position of said position detection imaging device, and

a step of determining an amount of offset between said position detection imaging device and said tool based upon results of said steps of measuring.

2. The offset measurement method according to Claim 1, wherein said step of measuring said position of said position detection imaging device is accomplished by imaging a specified reference point with said position detection imaging device.

3. The offset measurement method according to Claim 2, wherein

said reference point is a reference member which is disposed in a specified position,

said step of projecting and said step of measuring of said position of said tool are both accomplished in an attitude in which said tool is caused to approach said reference member, and

said step of determining said amount of offset further includes a step of specifying amounts of movement of said position detection imaging device and said tool between an attitude in which said position of said tool is measured and an attitude in which said reference point is imaged by said position detection imaging device.

4. The offset measurement method according to Claim 3, wherein

    said step of projecting said reference pattern is performed by projecting said reference pattern on both said tool and said reference member from said light source, and

    said step of measuring said position of said tool is accomplished based upon image light from both said tool and said reference member.

5. The offset measurement method according to Claim 3, wherein said step of measuring said position of said tool includes a step for conducting image light from said tool and said reference member to said position detection imaging device.

6. The offset measurement method according to Claim 4, wherein said step of measuring said position of said tool includes a step for conducting image light from said tool and said reference member to said position detection imaging device.

7. A bonding apparatus comprising:

    a position detection imaging device which images an object to be bonded, and

    a tool which is installed so as to be offset with respect to said position detection imaging device, and

    said bonding apparatus further comprising:

        a light source which is disposed in a specified position and which projects a reference pattern toward said tool at a specified angle of inclination with respect to a measurement direction, and

        an operation control device that determines an amount of offset between said position detection imaging device and said tool based upon:

            a measured value that is obtained when a position of said tool is measured based upon said reference pattern projected on said tool, and

            a measured value that is obtained when said position of said position detection imaging device is measured.

8. The bonding apparatus according to Claim 7, wherein said measuring of said position of said position detection imaging device is performed by imaging a specified reference point by said position detection imaging device.

9. The bonding apparatus according to Claim 8, wherein

    said reference point is a reference member that is disposed in a specified position, and

    said projection and said measurement of said position of said tool are both performed in an attitude in which said tool is caused to approach said reference member, and

    said bonding apparatus is further provided with a means which specifies amounts of movement of said position detection imaging device and tool between an attitude in which a position of said tool is measured and an attitude in which said reference point is imaged by said position detection imaging device.

10. The bonding apparatus according to Claim 9, wherein

    said projection of said reference pattern is performed onto both said tool and said reference member from said light source, and

    said measurement of said position of said tool is accomplished based upon image light from both said tool and said reference member.

11. The bonding apparatus according to Claim 9, further comprising optical members that conduct image light from said tool and said reference member to said position detection imaging device.

12. The bonding apparatus according to Claim 10, further comprising optical members that conduct image light from said tool and said reference member to said position detection imaging device.

13. A method for detecting a position of a tool that processes an object to be processed, said method comprising the steps of:

    projecting a reference pattern on said tool and a reference member that is disposed in a specified position, from a light source disposed in a specified position, and

measuring said tool based upon said reference pattern projected on said tool and said reference member.

14. A bonding apparatus comprising:

a position detection imaging device that images an object to be bonded,

a tool which is installed so as to be offset with respect to said position detection imaging device and processes said object to be bonded, and

an XY table which moves said position detection imaging device and said tool in an integral fashion, and

said bonding apparatus further comprising:

a light source which is disposed in a specified position and projects a reference pattern toward said tool at a specified angle of inclination with respect to a measurement direction, and

optical members which conduct image light from said tool and said reference member to said position detection imaging device, and

an operation control device which determines an amount of offset between said position detection imaging device and said tool based upon:

a measured value that is obtained by measuring a position of said tool based upon said reference pattern projected on said tool in a first attitude in which said tool is caused to approach said reference member by means of said XY table,

a measured value that is obtained by conducting said image light from said tool and said reference member to said position detection imaging device in said first attitude and by measuring a positional relationship between said tool and said reference member on an XY plane by means of said position detection imaging device,

a measured value that is obtained by measuring a positional relationship between said position detection imaging device and said reference member on said XY plane, said measuring is done by said position detection imaging device in a second attitude in which said position detection imaging device is caused to approach said reference member by means of said XY table, said reference member being disposed in a specified position, and

amounts of movement of said position detection imaging device and said tool between said first attitude and said second attitude.